

CLAIMS

We claim:

- 5 1. A regenerable Nickel (Ni) catalyst particularly suited for a hydrocarbon reforming process, said catalyst comprising discrete Ni crystallites formed on a suitable support element by a several incipient wetness steps process and capable of withstanding at least 6 catalyst regenerations without significantly inhibiting its catalytic activity in said reforming process, said Ni crystallites being positioned in the inner surface of said suitable support element said crystallites having a crystallite characteristic dimension measured in any one direction in the range of between 10 and 1000 Å and a distribution on said support element of no more than 0.2 square meter of exposed nickel/ square meter of support surface.
- 10 2. A catalyst as defined in claim 1 wherein said support element is selected from the group comprising alumina and zeolite and other suitable supports having equivalent physical characteristics.
- 15 3. A catalyst as defined in claim 1 wherein said support element comprises alumina.
- 20 4. A catalyst as defined in claim 3 wherein said crystallite characteristic dimension measured in any one direction in the range of between 10 and 1000Å average size and a distribution on said support element of no more than 0.2m² of exposed nickel /m² of said support surface.
- 25 5. A catalyst as defined in claim 3 wherein said average size is in the range of between 150 Å and 250 Å and a distribution on said support element of no more than 0.16 of said m² of exposed nickel / m² of said support surface.
6. A catalyst as defined in claim 4 wherein said alumina is α alumina.

7. A catalyst as defined in claim 5 wherein said alumina is α alumina.

8. A catalyst as defined in claim 1 wherein said support element comprises zeolite.

5 ~~9. A catalyst as defined in claim 8 wherein said average size is in the range of between 5 Å and 100 Å and a distribution on said support element of no more than 0.15 m² nickel exposed / m² of said support surface.~~

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10 ~~10. A catalyst as defined in claim 8 wherein said average size is in the range of between 10 Å and 70 Å of no more than 0.10 m² nickel exposed / m² of said support surface.~~

~~11. A catalyst as defined in claim 9 wherein said zeolite is selected from the group consisting of NaY (sodium exchanged Y type zeolite) and USY (ultrastabilized Y type zeolite).~~

15 ~~12. A catalyst as defined in claim 10 wherein said zeolite is selected from the group ultrastabilized Y type zeolite.~~

20 ~~13. A catalyst as defined in claim 1 wherein said suitable support element has an average size in the range of between 5 and 200 microns.~~

~~14. A catalyst as defined in claim 1 wherein said suitable support element has an average size in the range of between 20 and 100 microns~~

25 ~~15. A catalyst as defined in claim 6 wherein said suitable support element has an average size in the range of between 5 and 200 microns.~~

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16. A catalyst as defined in claim 6 wherein said suitable support element has an average size in the range of between 20 and 100 microns.
- 5 17. A catalyst as defined in claim 7 wherein said suitable support element has an average size in the range of between 5 and 200 microns.
18. A catalyst as defined in claim 7 wherein said suitable support element has an average size in the range of between 20 and 100 microns.
- 10 19. A catalyst as defined in claim 11 wherein said suitable support element has an average size in the range of between 5 and 200 microns
20. A catalyst as defined in claim 11 wherein said suitable support element has an average size in the range of between 20 and 100 microns.
- 15 21. A catalyst as defined in claim 12 wherein said suitable support element has an average size in the range of between 5 and 200 microns.
22. A catalyst as defined in claim 12 wherein said suitable support element has an average size in the range of between 20 and 100 microns.
- 20 23. A reforming process comprising reforming hydrocarbons in the presence of a catalyst in a reaction zone, said catalyst being Nickel (Ni) catalyst of discrete Ni crystallites formed on said support by a several step incipient wetness process, said
- 25 crystallites having a maximum dimension measures in any one direction in the range of between 10 and 1000 Å and a distribution on said support element of no more than 0.2 of said square meter of nickel exposed metal/ square meter of support selected from alumina and zeolite materials recycling said catalyst to and from said

reaction zone, regenerating between 10 and 100 % of the catalyst being recycled in a regeneration zone to provide a regenerated catalyst and returning said regenerated catalyst to said reaction zone

SUB 37

5 24. A reforming process as defined in claim 23 wherein said support comprises zeolite and said reforming process is a dry reforming process.

25. A reforming process as defined in claim 23 wherein said support comprises alumina and said reforming process is a steam reforming process.

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